

Title: EEG-EMG Band Power Correlation (BPC) Based BCI

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Abstract: Since the beginning of human history, people have been fascinated by the concept that they could be able to influence their surroundings via the power of simple "thinking." This goal is becoming closer and closer to becoming a reality because of the development of brain-computer interface (BCI) technology over the past few decades. The continuing activity taking place inside of a human brain may be translated into a variety of commands that can either be used to communicate or to operate an external device through the use of a BCI system. The process begins with the capture of brain signals, which can be carried out in an invasive or non-invasive manner. The following stage, which comes after the data collecting, is the processing of the signals in order to obtain relevant elements connected with the user's intentions of carrying out a task. The BCI based neurorehabilitation model used this EEG signal from the brain and the EMG signal from the muscle to develop BCI based neurorehabilitation models that combine any biological signals, with brain signal, which can make robot-assisted systems work better. To do so, we used the Band Power Correlation (BPC) derived EEG-EMG hybridization technology that classified the motor task in the BCI system based on the trial. Combining EEG and EMG signals, as well as cortical-muscular interplay in order to activate a hand exoskeleton device, and assessing its viability on stroke patients. We calculate the BPC which is used to classify, the right and the left hand motion.

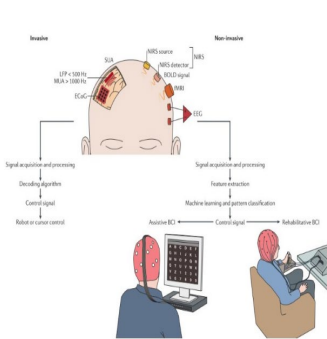


FIGURE 1.1: A look at the brain-computer interface (BCI) system as a whole.[15]

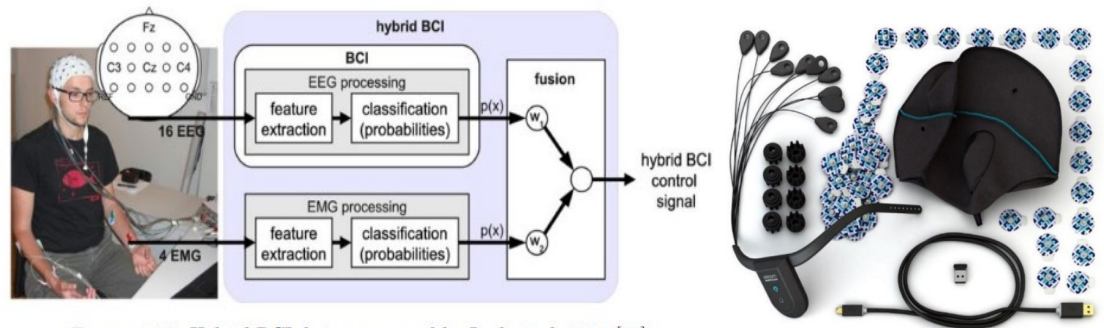


FIGURE 1.2: Hybrid BCI design proposed by Leeb et al. 2011 [12].

FIGURE 3.1: Component of UBI kit

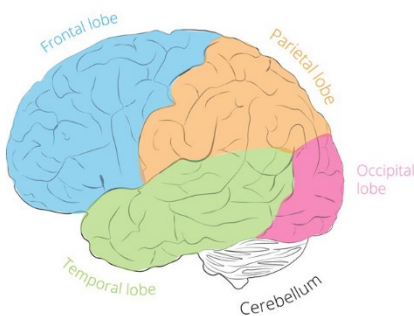


FIGURE 2.1: Different Parts of brain[11]



FIGURE 3.5: Surface Electrodes

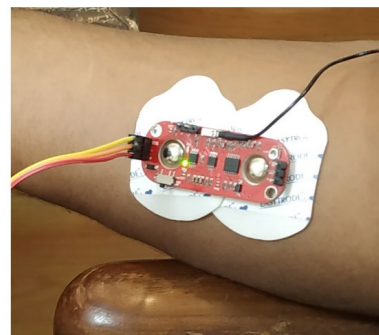


FIGURE 3.6: BCI kit